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# UNILATERAL WHITE OUT LUNG- A RARE CASE PRESENTATION

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**ABSTRACT:**

A lung whiteout occurs when the black in a lung field is replaced by white, suggesting that less air is entering the alveoli, maybe due to a mechanical obstruction, increased fluid, consolidation, or other factors. Lung contusion occurs when the lung's parenchyma sustains direct or indirect damage as a result of chest trauma, resulting in oedema or alveolar hematoma and the loss of the lung's physiological structure and function. Within 24 hours after the injury, there is a reduction in gas exchange, an increase in pulmonary vascular resistance, and a decrease in pulmonary compliance. Patients with serious injuries experience ARDS as a result of the inflammatory response.

Chest trauma may cause lung contusions, which can manifest clinically in a number of ways. The most of the time, it goes unnoticed and is only discovered after serious complications have surfaced. Lung contusions can appear alone or in conjunction with chest injuries. It must be highlighted that a blunt or penetrating chest injury need not always be present for lung contusion to exist clinically. Nowadays, as a result of traffic accidents, lung contusion may manifest without actual tissue injury in the chest wall as a condition starting an independent, life-threatening generalised process. Although pulmonary contusion shares some clinical outcomes with lung blast injury, various variables contribute to its aetiology and pathophysiology. It is difficult to describe and identify it as a distinct pathology. Thoracic trauma, pulmonary contusion, pulmonary laceration, and lung contusion are a few methods that, despite sharing some clinical symptoms, appear in various diseases. It is actually difficult to differentiate between pathologies with similar meanings and sometimes similar clinical paths; they may accompany other injuries to the trunk, skull, or extremities, which alone are linked to severe morbidity and mortality. In general, it can be concluded that in addition to high-energy, blunt injuries to the trunk, lung contusion has been a frequently ignored additional radiological finding, despite the fact that its long-term effects are extremely important in determining the injured person's prospects.

**KEYORDS**

Whiteout lung

## INTRODUCTION

## CASE REPORT

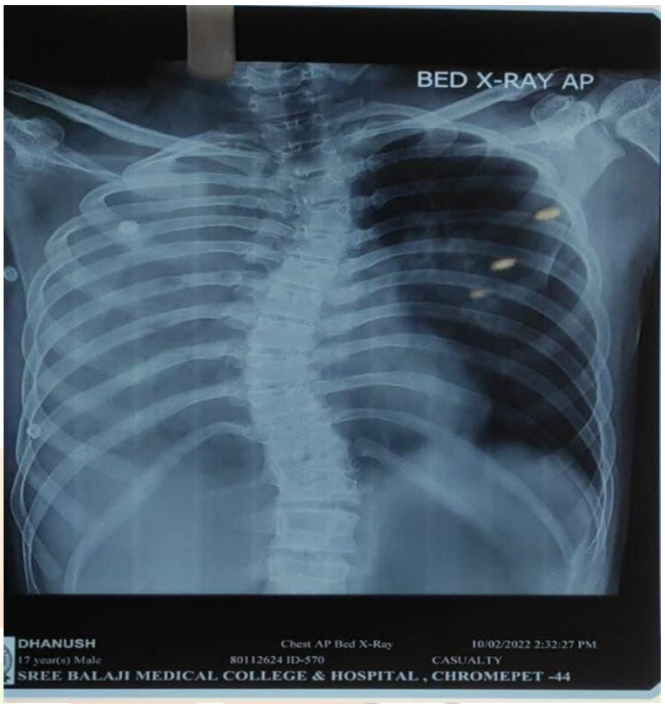
A 17-year-old patient who had allegedly suffered injuries to the right side of his chest and right forearm as a result of a nitrogen cylinder explosion and then experienced two episodes of hemoptysis was taken to the emergency room. On February 10, 2022, at around 1:00 am, a nitrogen cylinder burst, resulting in several abrasions on the patient's chest, face, hand, and torso as well as a right forearm fracture that required treatment outside of a hospital. Patient has low blood pressure and desaturation upon admission; receives inotrope support, antibiotics, and then Patient received steroids, and injection was moved to SBMCH Ho two incidents of vomiting blood -> ? Hemoptysis

## COURSE IN HOSPTITAL

Patient admitted with above mentioned complaints. All routine investigations were done. HRCT

Chest done outside showing Features of ? Chemical Pneumonitis. General Surgery opinion was taken regarding lacerations and orders followed, suggested CT Brain, Neurosurgery opinion taken, and orders followed. OFMS opinion was taken for FRACTURE OF LATERAL WALL OF RIGHT ORBIT and orders followed Patient was shifted to ICU and there was decreasing GCS. Desaturation and Elective Intubation was done with consent. Patient treated with IV fluids, analgesics, antibiotic, Ventilator support, POP for Right forearm fracture and other supportive measures. Orthopedic opinion was taken for Right Forearm Both Bone, 4th & 5th Metacarpal fracture without DNVD and suggested for ORIF with plating right Forearm with ORIF with Manipulation Right Metacarpal, but patient not willing for procedure due to affordability constraints. ENT opinion taken and orders followed. I unit of blood transfusion was done Candida Albicans and Non albicans growth (+) in wound culture of middle, right finger respectively, patient started on anti-fungal agents. Patient improved symptomatically and hence being referred to GH for further management of right forearm fracture

CHEST X RAY-image 1



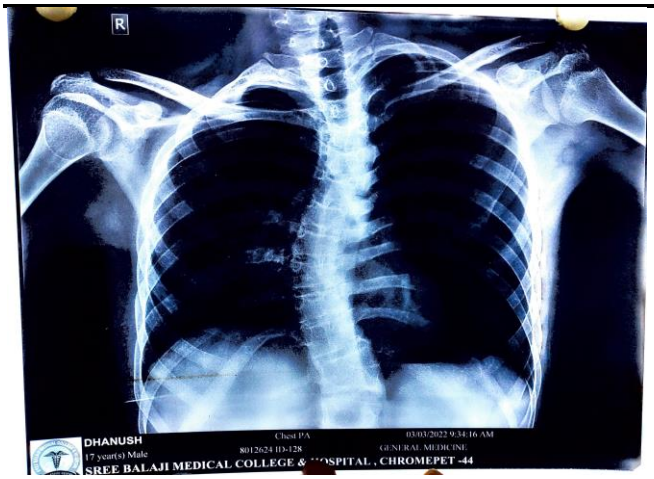

AP VIEW

SCOLIOSIS NOTED WITH THORACIC VERTEBRAE WITH A CRANIAL CONVEXITY TOWARDS RIGHT

HOMOGENOUS OPACITY NOTED INVOLVING COMPLETE RIGHT LUNG WITH MILD LOSS OF CARDIAC SILHOUETTE (WHITE OUT LUNG)

OUTCOME

Chest xray image 2 at the time of discharge




DISCUSSION

The severity of organ damage depends on several factors:

- Location and direction of the force
- Velocity
- Weight and size of the impulse
- Flexibility of the chest wall
- General condition of thoracic organs
- the body's posture and whether it is fixed or in motion when the accident occurs.

Although high-energy, abrupt chest traumas frequently result in rib fractures, acutely developing, possibly fatal pneumothorax (PTX) and hemothorax (HTX) are not always associated with cracked ribs.

MECHANISM OF LUNG INJURY IN CONTUSION:

Disruption of the capillaries of the alveolar walls and septa causes leakage of blood into the alveolar spaces and interstitium.

It is the most common type of lung injury in blunt chest trauma.

Three possible mechanisms of development of contusion are:

1. Inertial effect: Due to differing tissue densities at different locations of the lung and consequently different rates of acceleration or deceleration, the lighter alveolar tissue is sheared from the heavier hilar structures.

2. The "spalling effect" occurs when a shock wave strikes lung tissue at the boundary between a gas and a liquid, causing the lung tissue to burst or shear.

3. Implosion effect: This phenomenon takes place when a pressure wave travels through a tissue holding gas bubbles. The bubbles collapse first, then rebound and expand past their original volume Alveoli are stretched and torn by gas bubble overexpansion.

Pulmonary Contusion

PC is a frequent injury, accounting for up to 17% of all trauma admissions and having a frequency of 30% to 75% in patients with traumatic thoracic damage. PC typically develops after a severe injury, but it can also show up next to a missile tract through the lung parenchyma. The contused lung shows oedema, alveolar and intraparenchymal bleeding, and atelectasis at the microscopic level, which causes intrapulmonary shunting, ventilation-perfusion mismatch, and reduced lung compliance. Hypoxemia, hypercarbia, and an increase in breathing effort are the results of this. Although the full effects of PC might not be visible right once, they become noticeable within 24 hours if they are clinically important. PC typically progresses to dysfunction within the first few days before healing within a week.

Severe PC can have systemic consequences. Animal studies show that after unilateral contusion, there is capillary leak in both ipsilateral and contralateral sides. Increased edoema and inflammatory cell buildup occur in both lungs. There is evidence of global immunological dysfunction as well as an increase in inflammatory cytokines both locally and systemically. PC also sets the immune system up for an increased reaction to a subsequent second impact,

such an infection. Ventilator-associated pneumonia occurs twice as frequently in trauma patients with PC as it does in individuals without PC. More than half of PC patients develop lung fibrosis at 6 years after injury, and long-term lung function may be reduced.

Given that not all PCs are clinically meaningful, various authors have tried to pinpoint the variables that predict outcome. De Moya and associates created a simplified scoring method to predict the requirement for mechanical breathing by integrating the initial CT findings, Glasgow Coma Score, and number of fractured ribs. It's interesting to note that in this study, less than one-third of all PCs were visible on the first chest radiograph. The importance of "occult" PC has been contested by several scholars (i.e., apparent only on CT). According to a prospective analysis of 255 individuals with PC, those who had occult PC fared no worse than those who did not, but those who had PC visible on both a chest radiograph and a chest CT scan had noticeably worse results. Others have tried to link PC size (measured as a proportion of total lung volume) with outcomes. According to studies, those with PC volumes higher than 20% of their total lung volume are more likely to need mechanical ventilation, develop pneumonia, and experience acute respiratory distress syndrome (ARDS).

Since there is currently no ideal strategy to treat PC, treatment of the condition focuses mostly on supportive care and preventing iatrogenic harm. Antibiotics used as a preventative measure are strongly disapproved, as are steroids. Four decades ago, Trinkle and colleagues discovered that while diuresis reduced PC size, crystalloid treatment enhanced PC size. Arginine vasopressin and dexmedetomidine are two pharmaceutical treatments that are currently being researched. Dexmedetomidine infusion was found to enhance hemodynamic parameters, reduce inflammatory infiltration, limit the severity of lung injury, and eliminate pulmonary edoema in a recent animal research.

- In hemodynamically stable post-trauma patients, non-invasive positive pressure ventilation (NIPPV) may minimize the need for intubation without causing respiratory failure to worsen.
- The desirable PEEP for each patient should be attained and maintained as part of patient care.
- persistent Hypercapnia and hypoxia are two possible effects of insufficient airflow.
- conversely, hypocapnia and hyperoxia can result from excessive breathing. Barotrauma may develop from the use of extremely high pressures, and volume-trauma may result from the use of excessively high volumes.
- Pulmo-protective respiration is the main goal of the respiratory strategy for post-trauma patients. It refers to tidal volumes of 6 to 8 mL per kilogramme of ideal body weight. By doing so, we can lessen the structural harm and over-distention of the alveoli.
- It is feasible to prevent volume-trauma, barotrauma, and atelecto-trauma as well as to cut the risk of ARDS, the number of ventilation days, and the length of hospitalisation by titrating the optimal respiratory parameters.
- Extracorporeal CO2 removal and membrane oxygenation show great promise for the future, without a doubt.
- Prophylactic antibiotics, Diuretics, I.V Steroids can be helpful and other supportive drugs.
- Aggressive pulmonary toilet and adequate analgesia are paramount in preventing pneumonia.

**When should the thoracic surgeon definitely be involved?**

According to the ATLS guideline this is recommended as follows (1):

- Blood loss over the chest TD >1,500 mL initially or >200 mL/hour over 2–4 hours.
- Hemoptysis.
- Massive subcutaneous emphysema.
- Important air-leakage over the chest tub.
- Uncertain images on the chest X-ray or CT thorax.
- Penetrating chest trauma.

Indications for an immediate thoracic surgical intervention are (1):

- Blood loss ≥1,500 mL initially/>200 mL/hour over 2–4 hours.
- Endobronchial blood loss; massive contusion with significant impairment of mechanical ventilation.
- Tracheobronchial tree injury (air-leakage/hemothorax);
- Injury of the heart or large vessels (blood loss/pericardial tamponade).

## CONFLICT OF INTEREST

There is no conflict of interest